

Hiroshi ISHIIHARA, S.N. 10/661,320
Page 2

Dkt. No. 2:71/71058

Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

Claim 1 (currently amended): An information processing apparatus comprising:

a drawing omission determination unit that determines whether drawing process corresponding to a graphical drawing instruction, out of a plurality of graphical drawing instructions, can or cannot be omitted based on a drawing attribute of a pattern corresponding to the graphical drawing instruction;

a selection unit that makes the graphical drawing instruction invalid if the drawing omission determination unit determines that the drawing process corresponding to the graphical drawing instruction to be made invalid can be omitted, and makes other graphical drawing instructions valid; and

an output unit that outputs to an information formation apparatus the other graphical drawing instructions to obtain an image corresponding to the other graphical drawing instructions which are executed,

wherein when the graphical drawing instruction is made invalid, the drawing process corresponding to the graphical drawing instruction is not performed.

Claim 2 (original): The information processing apparatus according to claim 1, wherein the graphical drawing instruction is described in a page description language that includes a basic graphical drawing instruction which specifies a pattern to be drawn, and a drawing attribute instruction which specifies the drawing attribute.

Claim 3 (original): The information processing apparatus according to claim 1, wherein the drawing attribute includes information about a color of a pattern concerning the graphical drawing instruction and a method for performing the drawing process.

Claim 4 (original): The information processing apparatus according to claim 3, wherein the drawing omission determination unit determines that the drawing process can be omitted

Hiroshi ISHIHARA, S.N. 10/661,320
Page 3

Dkt. No. 2271/71058

when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process regardless of the contents of the memory.

Claim 5 (original): The information processing apparatus according to claim 4, wherein the drawing omission determination unit determines that the drawing process can be omitted when it is determined from the drawing attribute of a pattern concerning the graphical drawing instruction and a method for performing the drawing process that the contents of a memory at a drawing destination are not changed before and after the drawing process regardless of the contents of the memory.

Claim 6 (original): The information processing apparatus according to claim 5, wherein the drawing omission determination unit determines that the drawing process can be omitted when the color density is the lowest and also when the method is a logical sum (OR) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 7 (original): The information processing apparatus according to claim 1, wherein the drawing omission determination unit determines that the drawing process can be omitted when a memory at a drawing destination is in an initialized state.

Claim 8 (original): The information processing apparatus according to claim 1, further comprising an output status flag that indicates whether the selection unit has already set a certain graphical drawing instruction valid, wherein

the drawing omission determination unit determines whether the drawing process can be omitted based on the state of the output status flag.

Claim 9 (original): The information processing apparatus according to claim 8, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag indicates that the graphical drawing instruction is not yet set valid, and also when the drawing attribute of a pattern concerning the graphical drawing instruction does not

Hiroshi ISHIHARA, S.N. 10/661,320
Page 4

Dkt. No. 2271/71058

change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

Claim 10 (original): The information processing apparatus according to claim 8, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag indicates that the graphical drawing instruction is not yet set valid, when the color density is the lowest and also when a method for performing the drawing process is a replacement (SET) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 11 (original): The information processing apparatus according to claim 8, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag indicates that the graphical drawing instruction is not yet set valid, when the color density is the lowest and also when a method for performing the drawing process is a logical sum (OR) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 12 (original): The information processing apparatus according to claim 8, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag indicates that the graphical drawing instruction is not yet set valid, when the color density is the lowest and also when a method for performing the drawing process is an exclusive logical sum (XOR) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 13 (original): The information processing apparatus according to claim 8, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag indicates that the graphical drawing instruction is not yet set valid, when a method of the drawing process is a logical product (AND) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Hiroshi ISHIIHARA, S.N. 10/661,320
Page 5

Dkt. No. 2271/71058

Claim 14 (original): The information processing apparatus according to claim 8, wherein the output status flag indicates whether the selection unit has already set a certain graphical drawing instruction valid for each graphical drawing instruction concerning an image for one page.

Claim 15 (original): The information processing apparatus according to claim 8, wherein one page is divided into specific number of determination regions, and the output status flag is provided for each determination region, and

the drawing omission determination unit determines whether the drawing can be omitted based on the status of the output status flag for each determination region to which a drawing region concerning the graphical drawing instruction belongs.

Claim 16 (original): The information processing apparatus according to claim 15, wherein the determination regions are decided based on bands.

Claim 17 (original): The information processing apparatus according to claim 1, wherein when the graphical drawing instruction concerns a pattern of a color, the drawing omission determination unit determines whether the drawing process can be omitted for each color plane of the color.

Claim 18 (original): The information processing apparatus according to claim 1, wherein the drawing omission determination unit determines whether the drawing process can be omitted only when a pattern concerning the graphical drawing instruction is a graphic pattern.

Claim 19 (original): The information processing apparatus according to claim 1, wherein when a pattern concerning the graphical drawing instruction is an image pattern, the drawing omission determination unit detects continuous pixels of the same color within the image pattern, and determines whether the drawing process can be omitted for each portion of continuous pixels.

Claim 20 (original): The information processing apparatus according to claim 1, wherein when a pattern concerning the graphical drawing instruction is an image pattern, the drawing

Hiroshi ISHIHARA, S.N. 10/661,320
Page 6

Dkt. No. 2271/71058

omission determination unit determines whether the drawing process can be omitted of the image pattern in a word length unit.

Claim 21 (original): The information processing apparatus according to claim 1, wherein the output unit outputs the other graphical drawing instructions to the image formation apparatus one-by-one.

Claim 22 (original): The information processing apparatus according to claim 1, further comprising a drawing data memory that stores the other graphical drawing instructions, wherein the output unit outputs the other graphical drawing instructions stored in the drawing data memory to the image formation apparatus altogether.

Claim 23 (currently amended): An image formation apparatus comprising:

a page memory;

a drawing omission determination unit that determines whether drawing process corresponding to a graphical drawing instruction, out of a plurality of graphical drawing instructions, can or cannot be omitted based on a drawing attribute of a pattern corresponding to the graphical drawing instruction;

a selection unit that makes the graphical drawing instruction invalid if the drawing omission determination unit determines that the drawing process corresponding to the graphical drawing instruction to be made invalid can be omitted, and makes other graphical drawing instructions valid;

a drawing unit that performs the drawing process to draws an image onto the page memory based on the other graphical drawing instructions; and

an image formation unit that forms an image onto a recording medium paper based on the image on the page memory,

wherein when the graphical drawing instruction is made invalid, the drawing process corresponding to the graphical drawing instruction is not performed.

Claim 24 (original): The image formation apparatus according to claim 23, wherein the graphical drawing instruction is described in a page description language that includes a

Hiroshi ISHIHARA, S.N. 10/661,320
Page 7

Dkt. No. 2271/71058

basic graphical drawing instruction which specifies a pattern to be drawn, and a drawing attribute instruction which specifies the drawing attribute.

Claim 25 (original): The image formation apparatus according to claim 23, wherein the drawing attribute includes information about a color of a pattern concerning the graphical drawing instruction and a method for performing the drawing process.

Claim 26 (original): The image formation apparatus according to claim 25, wherein the drawing omission determination unit determines that the drawing process can be omitted when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process regardless of the contents of the memory.

Claim 27 (original): The image formation apparatus according to claim 26, wherein the drawing omission determination unit determines that the drawing process can be omitted when it is determined from the drawing attribute of a pattern concerning the graphical drawing instruction and a method for performing the drawing process that the contents of a memory at a drawing destination are not changed before and after the drawing process regardless of the contents of the memory.

Claim 28 (original): The image formation apparatus according to claim 27, wherein the drawing omission determination unit determines that the drawing process can be omitted when the color density is the lowest and also when the method is a logical sum (OR) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 29 (original): The image formation apparatus according to claim 23, wherein the drawing omission determination unit determines that the drawing process can be omitted when a memory at a drawing destination is in an initialized state.

Claim 30 (original): The image formation apparatus according to claim 23, further

Hiroshi ISHIHARA, S.N. 10/661,320
Page 8

Dkt. No. 2271/71058

comprising an output status flag for each graphical drawing instruction, wherein the selection unit sets an output status flag corresponding a certain graphical drawing instruction to set that graphical drawing instruction valid, wherein

the drawing omission determination unit determines whether the drawing process can be omitted based on the state of the output status flag.

Claim 31 (original): The image formation apparatus according to claim 30, wherein
the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set and when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

Claim 32 (original): The image formation apparatus according to claim 30, wherein
the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set, when the color density is the lowest, and when a method for performing the drawing process is a replacement (SET) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 33 (original): The image formation apparatus according to claim 30, wherein
the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set, when the color density is the lowest and also when a method for performing the drawing process is a logical sum (OR) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 34 (original): The image formation apparatus according to claim 30, wherein
the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set, when the color density is the lowest, and when a method for performing the drawing process is an exclusive logical sum (XOR) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Hiroshi ISHIHARA, S.N. 10/661,320
Page 9

Dkt. No. 2271/71058

Claim 35 (original): The image formation apparatus according to claim 30, wherein the drawing omission determination unit determines that the drawing process can be omitted when the output status flag is not set and when the modification method is a logical product (AND) among the drawing attributes of a pattern concerning the graphical drawing instruction.

Claim 36 (original): The image formation apparatus according to claim 30, wherein the output status flag indicates whether a certain graphical drawing instruction has been made valid for each graphical drawing instruction concerning an image for one page.

Claim 37 (original): The image formation apparatus according to claim 30, further comprising a dividing unit that divides one page into a specific number of determination regions, and the output status flag is provided for each determination region, and the drawing omission determination unit determines whether the drawing can be omitted based on the status of the output status flag for each determination region to which a drawing region concerning the graphical drawing instruction belongs.

Claim 38 (original): The image formation apparatus according to claim 37, wherein the dividing unit divides the one page into the determination regions based on bands.

Claim 39 (original): The image formation apparatus according to claim 23, wherein the graphical drawing instruction concerns a pattern of a color, and the drawing omission determination unit determines whether the drawing process can be omitted for each color plane of the color.

Claim 40 (original): The image formation apparatus according to claim 23, wherein the drawing omission determination unit determines whether the drawing process can be omitted when the graphical drawing instruction corresponds to a graphic pattern.

Claim 41 (original): The image formation apparatus according to claim 23, wherein

Hiroshi ISHIHARA, S.N. 10/661,320
Page 10

Dkt. No. 2271/71058

when a pattern concerning the graphical drawing instruction is an image pattern, the drawing omission determination unit detects continuous pixels of the same color within the image pattern, and determines whether the drawing process can be omitted for each portion of continuous pixels.

Claim 42 (original): The image formation apparatus according to claim 23, wherein
when a pattern concerning the graphical drawing instruction is an image pattern, the drawing omission determination unit determines whether the drawing process can be omitted of the image pattern in a word length unit.

Claim 43 (original): The image formation apparatus according to claim 23, wherein
the output unit outputs the other graphical drawing instructions to the image formation apparatus one-by-one.

Claim 44 (original): The image formation apparatus according to claim 23, further comprising a drawing data memory that stores the other graphical drawing instructions, wherein
the output unit outputs the other graphical drawing instructions stored in the drawing data memory to the image formation apparatus altogether.

Claim 45 (original): The image formation apparatus according to claim 23, further comprising:
a receiving unit that receives the drawing instructions from an external source; and
an interpreter that converts the drawing instructions into the graphical drawing instructions of a format which is suitable for the drawing process.

Claim 46 (currently amended): A machine-implemented drawing processing method comprising:

(a) determining whether drawing process corresponding to a graphical drawing instruction, from a plurality of graphical drawing instructions, can or cannot be omitted by an image formation apparatus, based on a drawing attribute of a pattern corresponding to the graphical drawing instruction; and

Hiroshi ISHIIHARA, S.N. 10/661,320
Page 11

Dkt. No. 2:71/71058

(b) making other graphical drawing instructions valid and the graphical drawing instruction invalid and generating a graphical drawing output by said image forming apparatus by executing said valid other graphical drawing instructions and not executing said invalid graphical drawing instruction made invalid, to reduce a number of operations performed by said image formation apparatus, if it is determined in (a) that the drawing process corresponding to the graphical drawing instruction to be made invalid can be omitted by the image formation apparatus.

Claim 47 (original): The drawing processing method according to claim 46, wherein the determining includes determining that the drawing process can be omitted when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process regardless of the contents of the memory.

Claim 48 (original): The drawing processing method according to claim 47, wherein the determining includes determining that the drawing process can be omitted when it is determined from the drawing attribute of a pattern concerning the graphical drawing instruction and a method for performing the drawing process that the contents of a memory at a drawing destination are not changed before and after the drawing process regardless of the contents of the memory.

Claim 49 (original): The drawing processing method according to claim 46, wherein the determining includes determining that the drawing process can be omitted when a memory at a drawing destination is in an initialized state.

Claim 50 (original): The drawing processing method according to claim 46, wherein the determining includes determining whether the drawing process can be omitted based on a state of an output status flag that is set when a certain graphical drawing instruction is made valid.

Claim 51 (previously presented): The drawing processing method according to claim 50, wherein

the determining includes determining that the drawing process can be omitted when the

Hiroshi ISHIHARA, S.N. 10/661,320
Page 12

Dkt. No. 2271/71058

output status flag is not set and when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

Claim 52 (original): The drawing processing method according to claim 51, wherein the output status flag indicates whether a certain graphical drawing instruction has been made valid for each graphical drawing instruction concerning an image for one page.

Claim 53 (original): The drawing processing method according to claim 51, further comprising dividing one page into a desired number of determination regions, wherein the output status flag is provided in each determination region, and

the determining includes determining whether the drawing can be omitted based on the status of the output status flag for each determination region to which a drawing region concerning the graphical drawing instruction belongs.

Claim 54 (original): The drawing processing method according to claim 53, wherein the dividing includes dividing the one page into the determination regions based on bands.

Claim 55 (original): The drawing processing method according to claim 46, wherein the graphical drawing instruction concerns a pattern of a color, and the determining includes determining whether the drawing process can be omitted for each color plane of the color.

Claim 56 (original): The drawing processing method according to claim 46, wherein the graphical drawing instruction corresponds to an image pattern, and

the determining includes detecting continuous pixels of the same color within the image pattern, and determining whether the drawing process can be omitted for each portion of continuous pixels.

Claim 57 (original): The drawing processing method according to claim 46, wherein the

Hiroshi ISHIHARA, S.N. 10/661,320
Page 13

Dkt. No. 2271/71058

graphical drawing instruction corresponds to an image pattern, and

the determining includes determining whether the drawing process can be omitted from the image pattern in a word length unit.

Claim 58 (currently amended): A computer readable medium tangibly embodying instructions executable by a computer to perform operations comprising:

(a) determining whether drawing process corresponding to a graphical drawing instruction, from a plurality of graphical drawing instructions, can or cannot be omitted by an image formation apparatus, based on a drawing attribute of a pattern corresponding to the graphical drawing instruction; and

(b) making other graphical drawing instructions valid and the graphical drawing instruction invalid and generating a graphical drawing output by said image forming apparatus by executing said valid other graphical drawing instructions and not executing said invalid graphical drawing instruction, to reduce a number of operations performed by said image formation apparatus, if it is determined in (a) that the drawing process corresponding to the graphical drawing instruction to be made invalid can be omitted by the image formation apparatus.

Claim 59 (previously presented): The computer readable medium according to claim 58, wherein

the determining includes determining that the drawing process can be omitted when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process regardless of the contents of the memory.

Claim 60 (previously presented): The computer readable medium according to claim 59, wherein

the determining includes determining that the drawing process can be omitted when it is determined from the drawing attribute of a pattern concerning the graphical drawing instruction and a method for performing the drawing process that the contents of a memory at a drawing destination are not changed before and after the drawing process regardless of the contents of the memory.

Hiroshi ISHIIHARA, S.N. 10/661,320
Page 14

Dkt. No. 2271/71058

Claim 61 (previously presented): The computer readable medium according to claim 58, wherein

the determining includes determining that the drawing process can be omitted when a memory at a drawing destination is in an initialized state.

Claim 62 (previously presented): The computer readable medium according to claim 58, wherein

the determining includes determining whether the drawing process can be omitted based on a state of an output status flag that is set when a certain graphical drawing instruction is made valid.

Claim 63 (previously presented): The computer readable medium according to claim 62, wherein

the determining includes determining that the drawing process can be omitted when the output status flag is not set and when the drawing attribute of a pattern concerning the graphical drawing instruction does not change the contents of a memory at a drawing destination before and after the drawing process when the memory is in an initialized state even when the drawing process is carried out..

Claim 64 (previously presented): The computer readable medium according to claim 62, wherein

the output status flag indicates whether a certain graphical drawing instruction has been made valid for each graphical drawing instruction concerning an image for one page.

Claim 65 (previously presented): The computer readable medium according to claim 62, further comprising dividing one page into a desired number of determination regions, wherein the output status flag is provided in each determination region, and

the determining includes determining whether the drawing can be omitted based on the status of the output status flag for each determination region to which a drawing region concerning the graphical drawing instruction belongs.

Hiroshi ISHIHARA, S.N. 10/661,320
Page 15

Dkt. No. 2:271/71058

Claim 66 (previously presented): The computer readable medium according to claim 65, wherein the dividing includes dividing the one page into the determination regions based on bands.

Claim 67 (previously presented): The computer readable medium according to claim 58, wherein

the graphical drawing instruction concerns a pattern of a color, and the determining includes determining whether the drawing process can be omitted for each color plane of the color.

Claim 68 (previously presented): The computer readable medium according to claim 58, wherein the graphical drawing instruction corresponds to an image pattern, and

the determining includes detecting continuous pixels of the same color within the image pattern, and determining whether the drawing process can be omitted for each portion of continuous pixels.

Claim 69 (previously presented): The computer readable medium according to claim 58, wherein the graphical drawing instruction corresponds to an image pattern, and

the determining includes determining whether the drawing process can be omitted from the image pattern in a word length unit.

Claim 70 (canceled).

Claim 71 (previously presented): The information processing apparatus according to claim 1, wherein the drawing omission determination unit makes the determination whether the drawing process corresponding to the graphical drawing instruction can be omitted, before the drawing process is performed.

Claim 72 (new): The information processing apparatus according to claim 1, wherein said selection unit makes one or more of the other graphical drawing instructions valid if the determination unit determines that the drawing processes of said one or more of the other graphical

Hiroshi ISHIIHARA, S.N. 10/661,320
Page 16

Dkt. No. 2271/71058

drawing instructions cannot be omitted, said image is obtained based on the valid one or more of the other graphical drawing instructions which are executed.